What is claimed is:

1. A non-circular flat motor comprising:

a rotor;

a housing formed to be non-circular when viewed in a plane which rotatabley supports the rotor and has at least a part of side surfaces being a flat surface; and

a plurality of feeder terminals arranged at an angled corner at the side surface of the housing which is formed by electrically insulating all terminals of high electric potential from other portions adjacent thereto.

2. The motor as claimed in claim 1, wherein the armature coil is arranged at a stator base functioning as part of the housing and a magnet facing the armature coil is arranged at the rotor.

3. The motor as claimed in claim 2, wherein the housing is substantially rectangular when viewed in a plane and at least some of the feeder terminals are formed not to protrude outward over the angled corner as an angled portion for installation.

4. The motor as claimed in claim 1, further comprising a flat magnet, a bracket as part of the housing where the magnet is arranged, a brush incorporated with the feeder terminals via a gap between the bracket and the magnet, wherein the rotor receives electric power via the brush and faces the flat magnet via a gap in an axial direction.

5. The motor as claimed in claim 4, wherein a base end portion of the brush is formed as part of the feeder terminal as it is.

6. The motor as claimed in claim 4, wherein the housing is substantially rectangular when viewed in a plane and at least some of the feeder terminals are formed not to protrude outward over the angled corner as an installation portion.

7. A non-circular flat motor comprising:

a rotor;

a housing including a stator base having a shaft for supporting the rotor provided at the center thereof and having a non-circular shape when viewed in a plane, at least some portion of the housing being formed of resin; and

at least two feeder terminals arranged at an angled corner at the side surface of the housing which is formed by electrically insulating all terminals of high electric potential from other portions adjacent thereto.

8. The motor as claimed in claim 7, wherein the shaft is installed by erecting a shaft core from one portion of the housing constituting a stator and coating the shaft core with resin to form a resin coated, fixed shaft, and the rotor is rotatably installed from a tip of the resin coated, fixed shaft and the tip of the shaft is inserted in a concave portion installed at another portion of the housing.

9. The motor as claimed in claim 8, further comprising:

a yoke plate formed of a magnetic body and having the shaft core integrally protruding from the center thereof, constituting part of the housing;

a pair of brushes having a free end in sliding contact with the commutator and fixed such that at least two surfaces can expose base ends of the resin bracket portion through the brush recess portion;

a resin bracket portion which includes a resin coated, fixed shaft made by incorporating in the resin bracket portion at least part of the yoke plate and coating the shaft core with resin;

a rotor including a commutator and an armature coil having one end portion connected to the commutator and rotatably arranged at the resin coated, fixed shaft to face a magnet via a gap;

a brush recess portion formed at the yoke plate to insulate at least one brush;

the magnet arranged at least at the yoke portion of the resin bracket portion after the brushes are arranged; and

a case accommodating the rotor and installed at the resin bracket by inserting a tip of the resin coated, fixed shaft in a concave portion formed at the center of the

case, at least a magnetic path portion of the magnet being formed of a magnetic body.

10. The motor as claimed in claim 9, wherein the magnet is separated from the yoke plate by a small gap to enable reflow soldering.

11. The motor as claimed in claim 10, wherein the yoke plate is separated from the case except for a combined portion.

12. The motor as claimed in claim 11, wherein a portion for reflow soldering is not close to the combined portion.

13. The motor as claimed in claim 9, wherein the resin of the resin coated, fixed shaft includes potassium titanate whisker and has an anti-thermal feature bearing a thermal deformation temperature of over 200°C (18.5 kgf/cm^2) and a slippery feature.

14. A non-circular flat brushless motor comprising:

a metal plate incorporating a shaft support portion at the center thereof, forming part of a housing;

a fixed shaft supported by the shaft support portion;

a rotor rotatably installed at the fixed shaft from a tip thereof; and

a stator formed of a plurality of armature coils arranged around the fixed shaft to drive the rotor,

wherein the other part of the housing supports a tip of the fixed shaft.

15. The motor as claimed in claim 14, wherein the fixed shaft has a shaft core cut from a metal plate and the shaft core is coated with resin.

16. The motor as claimed in claim 14, wherein a pinion is incorporated in the rotor.

17. The motor as claimed in claim 1, wherein the rotor is formed to be eccentric to generate vibrations during rotation.

18. The motor as claimed in claim 7, wherein the rotor is formed to be eccentric to generate vibrations during rotation.

19. The motor as claimed in claim 9, wherein the rotor is formed to be eccentric to generate vibrations during rotation.

20. A method of manufacturing a brush type non-circular flat motor comprising the steps of:

press-pressing a lead frame having a plurality of yoke plates continuously installed at a predetermined pitch by a connection portion;

inserting the continuously installed yoke plates in an injection mold and integrally molding a resin bracket;

detaching at least the connection portion of the yoke plates among the respective connection portions;

installing the rotor at a fixed shaft to be capable of rotating; and

installing the case.

21. The method as claimed in claim 32, further comprising steps of:

fixing brushes to a resin bracket by a spot welding method, the brushes being formed by continuously installing via a plurality of connection portions at the same pitch as the predetermined pitch; and

installing a magnet at the yoke plate.

Abstract of the Disclosure

A non-circular flat motor in which terminal portions are installed at dead space and a manufacturing method thereof are disclosed. Since a flexible sheet type feeder terminal is not adopted, the motor can be easily held by a transferring apparatus and automatically mounted. Also, the feeder terminal has solderability and is easy to be reflow-soldered. A rotor and a housing supporting the rotor are formed to be non-circular when viewed in a plane. Feeder terminals or installation

terminals are arranged at corner portions at the side surfaces of the housing which are angled and using a circle as an inscribed circle. At least one feeder terminal of a high electric potential is insulated from the other portion. The corner portion is formed to be concave so that each of the terminals is prevented from protruding outward from the housing. Each of the terminals are bent to be easily reflow-soldered and exposed to the side of the housing.